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lens control means for determining motion direction and a speed of the magnification lens group in accordance with an output from said detection means, and for performing motion/stop control of the magnification lens group along the optical axis; and control means for controlling said lens control means so as to change a sensitivity of the motion of the magnification lens group relative to a detection result of said detection means in accordance with a photographing state.

49. An image pickup apparatus according to claim 48, wherein said lens group is removably and exchangeably mounted on a main body of the image pickup apparatus.

DK Sub 50 (Twice Amended) An image pickup apparatus according to claim 48, wherein said control means changes the motion speed of the magnification lens group relative to an output of said detection means.

REMARKS

The claims now pending in the application are Claims 1 to 7, 9, 10, 13 to 28, 31 to 33, 35 to 37, 40 to 45 and 47 to 50, the independent claims being Claims 1, 14, 17, 26, 42, 44 and 48. Claims 29, 30 and 34 have been cancelled. Claims 1, 14 to 28, 31 to 33, 35 to 38, 42, 44, 48 and 50 have been amended.

In the Official Action, the drawings were objected to on formal grounds; Claims 44, 45 and 47 were rejected under 35 U.S.C. § 102(b), as anticipated by U.S. Patent No. 5, 159,370 (Takahashi); Claims 1 to 7, 9, 10 and 13 were rejected under 35

U.S.C. § 103(a), as unpatentable over U.S. Patent No. 5, 278,601 (Kawanami) in view of U.S. Patent No. 5,485,200 (Shimizu); Claims 14 to 37, 40, 41, 48 and 50 were rejected under 35 U.S.C. § 103(a), as unpatentable over U.S. Patent No. 5,648,836 (Sato) in view of U.S. Patent No. 5,161,026 (Mabuchi); Claims 42 and 43 have been rejected under 35 U.S.C. § 103(a), as unpatentable over the Takahashi '370 patent in view of U.S. Patent No. 5,475,456 (Haraguchi); and Claim 49 has been rejected under 35 U.S.C. § 103(a), as unpatentable over the Sato '836 patent in view of the Kawanami '601 patent.

Reconsideration and withdrawal of the objection and rejections respectfully are requested in view of the above amendments and the following remarks.

Initially, in a formal matter, by separate paper filed concurrently herewith, Applicant has submitted a Request For Approval To Amend The Drawings. In that Request, Applicant has proposed formal amendments to Figs. 1 to 5, 12, 13, 14A and 14B, as suggested by the Examiner. No new matter has been added.

The various rejections of the claims over the cited art respectfully are traversed. Nevertheless, without conceding the propriety of the rejections, Claims 1, 14 to 28, 31 to 33, 35 to 38, 42, 44, 48 and 50 have been amended herein even more clearly to recite various novel features of the present invention, with particular attention to the Examiner's comments. Support for the proposed amendments may be found in the original application. No new matter has been added.

The present invention relates to a novel image pickup apparatus. In one aspect, as now recited in Claim 1, the present invention relates to an image pickup apparatus having a camera body and a lens unit. The image pickup apparatus comprises a ring member for driving the lens unit, detection means for detecting a change amount of a

rotation of the ring member, control means, providing in the lens unit, for performing motion/stop control of at least the lens unit along an optical axis in accordance with a detection result by the detection means, and motion direction setting means, providing in the camera body, for a user to set a desired motion direction of the lens unit relative to the rotation direction of the ring member; the motion direction setting means comprises (i) character display means, (ii) menu setting means, (iii) display means provided in the camera body and displaying an image picked up by the image pickup apparatus, (iv) a menu function control unit for controlling the character display means in accordance with the operation state of the menu setting means operated by the user, and for displaying a predetermined menu on a display screen of the display means, and (v) setting means for selecting a desired setting item among a plurality of items of the predetermined menu displayed on the display means by the menu function control means and setting a condition regarding the motion direction of the lens unit.

In another aspect, as now recited in independent Claim 14, the present invention relates to an image pickup apparatus having a camera part and a lens part detachably mounted on the camera part, with a magnification lens and a ring member that drives the lens part. In this aspect, the image pickup apparatus comprises communication means for performing communication between the camera part and the lens part, detection means which detects a change amount of a rotation of the ring member for driving the lens part, camera control means, provided in the camera part, for selecting and determining a response characteristic between an output of the detection means and a motion of the magnification lens, and for transmitting the selected response characteristic to the lens part, lens control means, provided in the lens part, for receiving information concerning the

selected response characteristic transmitted from the camera control means through the communication means, and for controlling the motion of the magnification lens in response to the operation of the ring member in accordance with the selected response characteristic, and storing means, provided in the camera part, for storing information of the response characteristic so that the selected response characteristic is not volatile even in the case of attaching/removing of the lens part.

Independent Claims 17 and 26 recite similar aspects of the present invention.

In another aspect, as now recited in independent Claim 42 the present invention relates to an image pickup apparatus comprising a ring member disposed concentrically about a lens optical axis of a lens unit, detection means for detecting a change amount of rotation of the ring member, control means for performing motion/stop control of at least a magnification lens group along the optical axis in accordance with a detection result by the detection means, and inhibition means for inhibiting the control means from performing the stop control during a predetermined period when the detection means detects a stop of rotation of the ring member.

In another aspect, as now recited in independent Claim 44, the present invention relates to an image pickup apparatus comprising a ring member disposed concentrically about a lens optical axis of a lens unit, detection means for detecting a change amount of rotation of the ring member, control means for determining motion direction and speed of a magnification lens group in accordance with an output of the detection means and performing motion/stop control of the magnification lens group along the optical axis, and change means for changing a sensitivity of motion/stop control of the

control means relative to a detection result of the detection means so as to start the motion of the magnification lens in accordance with a different detection result of the detection means.

In yet another aspect, as now recited in independent Claim 48, the present invention relates to an image pickup apparatus having a magnification lens group. The image pickup apparatus comprises a ring member disposed concentrically about a lens optical axis, detection means for detecting a change amount of a rotation of the ring member, lens control means for determining motion direction and a speed of the magnification lens group in accordance with an output from the detection means, and for performing motion/stop control of the magnification lens group along the optical axis, and control means for controlling the lens control means so as to change a sensitivity of the motion of the magnification lens group relative to a detection result of the detection means in accordance with a photographing state.

Applicant submits that the prior art fails to anticipate the present invention. Moreover, Applicant submits that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

CLAIM 1

The Kawanami ' 601 patent relates to an optical apparatus, and discloses an optical system including a camera part and a lens part having a ring member. The Kawanami '601 patent further is understood to disclose the feature of changing a relationship between a rotation direction of the ring member and a lens driving direction using a manual switch (see, Fig. 5). However, Applicant submits that the Kawanami '601

patent fails to disclose or suggest at least the above-discussed features of the present invention. Although the Kawanami '601 patent uses a switch to change the above-described relationship, nowhere does this patent disclose or suggest to select an item in a menu displayed on a display apparatus of a camera part, as disclosed and claimed in the present application.

The Shimizu '200 patent relates to an operational information renewing and memorizing apparatus and method for a photographing instrument, and discloses a system in which a user can set a photographing condition of a camera using a menu. However, Applicant submits that the Shimizu '200 patent fails to disclose or suggest at least the above-discussed features of the present invention. Rather in the Shimizu '200 patent system, the menu is displayed on the screen of an external PC (see, column 5, lines 36 to 46). Nowhere does the Shimizu '200 patent disclose or suggest that the menu may be provided in the camera part, as disclosed and claimed in the present application. Nor is the Shimizu '200 patent believed to add anything to the Kawanami '601 patent that would make obvious the claimed invention.

CLAIMS 14, 17 and 26

Each of these claims variously relates to a an image pickup apparatus which selects a response characteristic between a rotation amount of a ring member and a motion of a lens and stores the selected response characteristic so that it is not volatile even in the case of attaching /removing a detachable lens part.

The Sato '836 patent relates to an optical apparatus with control device for controlling a movable optical member, and discloses in Fig. 1 an apparatus including a

CPU 5 which controls a relationship between rotation of a ring member and lens driving in accordance with manual setting information. However, Applicant submits that the Sato '836 patent fails to disclose or suggest at least the above-discussed features of the present invention. Rather, Applicant understands the Sato '836 patent merely to disclose a system in which the relationship is volatile, that is, it fails to retain the setting information even in the case of attaching/removing a lens part.

The Mabuchi '026 patent relates to an interchangeable lens camera system having improved control information communication facility. However, Applicant submits that the Mabuchi '026 patent fails to disclose or suggest at least the above-discussed features of the present invention. In fact, the Mabuchi '026 patent fails even to disclose or suggest a ring member for operating the lens. Nor is the Mabuchi '026 patent understood to add anything to the Sato '836 patent that would make obvious the claimed invention.

CLAIM 42

In this aspect, the present invention relates to an image pickup apparatus that inhibits a lens drive control means from performing lens stop control during a predetermined period when a stop of rotation of a lens ring member is detected.

The Takahashi '370 patent relates to a powered zoom lens, and discloses a camera system including a powered zoom device for a camera and lens having a variable magnification lens group. However, Applicant submits that the Takahashi '370 patent fails to disclose or suggest at least the above-discussed features of the present invention. Rather, the Takahashi '370 patent is understood merely to disclose a zoom ring member.

Nowhere is Takahashi '370 patent understood to disclose or suggest inhibition of lens stop control, as disclosed and claimed in the present application.

The Haraguchi '456 patent relates to a zoom lens drive system for a lens shutter type of camera, and discloses at column 23, line 63 to column 24, line 2 the feature of removing back crash of a gear. However, Applicant submits that the Haraguchi '456 patent fails to disclose or suggest at least the above-discussed feature of the present invention. Although this feature relates to control of a gear which is a portion of a lens stop control, the Haraguchi '456 patent fails to teach inhibiting the lens stop control itself when rotation of the ring member is stopped, as disclosed and claimed in the present application. Nor is the Haraguchi '456 patent understood to add anything to the Takahashi '370 patent that would make obvious the claimed invention.

CLAIM 44

This aspect of the present invention relates to an image pickup apparatus that changes a sensitivity of motion/stop control of a control means which controls motion/stop of a lens in accordance with a detected rotation amount of a ring member, so as to start the motion of the lens in accordance with a different detection result of the rotation amount of the ring member.

The Takahashi '370 patent discloses the feature of changing a lens speed in accordance with a focal length (column 10, lines 1 to 11). However, this is distinguished from a relationship between a start timing of motion of a lens and a detection amount of rotation of a ring member. Nowhere is the Takahashi '370 patent understood to disclose or suggest the above-discussed feature of the present invention.

CLAIM 48

This aspect relates to the feature of automatically changing a sensitivity of lens motion control relative to a detected amount of rotation of a ring member in accordance with a photographic state (see, e.g., Fig. 25).

The Sato '836 patent discloses a system which manually changes a relationship between a lens driving mode and rotation amount of a ring member (see, column 5, lines 10 to 19; column 7, lines 19 to 26; and column 8, lines 31 to 46). This is in contrast to the present invention, which effects control that causes lens control means to change a lens control sensitivity in accordance with a photographing state. Nowhere is the Sato '836 patent understood to disclose or suggest the above-discussed feature of the present invention.

Likewise, the Mabuchi '026 patent is silent with respect to this feature.

For the above reasons, Applicant submits that Claims 1, 14, 17, 26, 42, 44 and 48 are allowable over the cited art.

The remaining claims variously depend from Claims 1, 14, 17, 26, 42, 44 and 48, and are believed allowable for the same reasons. Moreover, each of these claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

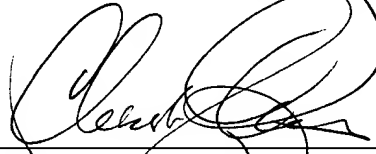
Applicant requests that the present Amendment be entered under 37 CFR 1.116. Applicant submits that the present amendments merely are minor or formal in nature, reduce the number of issues for consideration, and place the application in allowable condition. Applicant submits that the proposed amendments were necessitated

by the Examiner's comments in the Official Action, and were not earlier presented because Applicant believes the prior claims are allowable.

Applicant believes that the present Amendment is responsive to each of the points raised in the Official Action, and submit that the Application is in condition for allowance. Favorable consideration of the claims and passage to issue of the present application at the Examiner's earliest convenience earnestly are solicited.

Applicant's attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

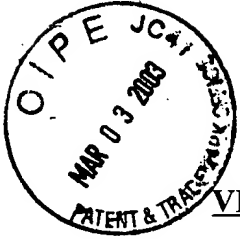


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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

1. (Four Times Amended) An image pickup apparatus having a camera body and a lens unit, comprising:

a ring member for driving the lens unit;

detection means for detecting a change amount of a rotation of said ring member;

control means, providing in the lens unit, for performing motion/stop control of at least the lens unit along an optical axis in accordance with a detection result by said detection means; and

motion direction setting means, providing in the camera body, for a user to set a desired motion direction of the lens unit relative to the rotation direction of said ring member,

wherein said motion direction setting means comprises (i) [a] character [generator] display means, (ii) menu setting means, (iii) display means provided in said [image pickup apparatus] camera body and displaying an image picked up by said image pickup apparatus, (iv) a menu function control unit for controlling said character [generator] display means in accordance with the operation state of said menu setting means operated by the user, and for displaying a predetermined menu on a display screen of the display means, and (v) setting means for selecting a desired setting item among a plurality of items [displayed on the predetermined menu] of the predetermined menu displayed on said display means by said menu function control means and setting a condition regarding the motion direction of the lens unit.

14. (Four Times Amended) An image pickup apparatus having [(i)] a camera part[,] and [(ii)] a lens part[,] detachably mounted on the camera part, with a magnification lens and a ring member that drives the lens part, comprising:

communication means for performing communication between said camera part and said lens part;

detection means which detects a change amount of a rotation of the ring member for driving the lens part;

camera control means, provided in the [lens] camera part, for selecting and determining a response characteristic between an output of said detection means and a motion of the magnification lens, and for [controlling motion/stop of at least the magnification lens along an optical axis in accordance with an output of said detection means] transmitting the selected response characteristic to said lens part;

lens control means, provided in said lens part, for receiving information concerning the selected response characteristic transmitted from said camera control means through said communication means, and for controlling the motion of said magnification lens in response to the operation of said ring member in accordance with the selected response characteristic; and

[transmitting means for performing communication between the camera part and the lens part; and]

storing means, provided in said camera part, for storing information of the response characteristic [transmitted from the lens part] so that the selected response characteristic is not volatile even in the case of attaching/removing of said lens part.

15. (Twice Amended) An image pickup apparatus according to claim 14, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to be constant and a second characteristic for controlling a motion speed of the magnification lens to be variable in accordance with a rotation speed of the ring member.

16. (Twice Amended) An image pickup apparatus according to claim 14, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to become a first predetermined amount and a second characteristic for controlling a motion amount of the magnification lens per unit rotation of the ring member to become a second predetermined amount different from the first predetermined amount.

17. (Four Times Amended) An image pickup apparatus having [(i)] a camera part[, and (ii)] on which a lens part[,] is detachably mountable, [mounted on the camera part, with a magnification lens and] the lens part having a ring member that drives the lens part, comprising:

communication means for performing communication between said camera part and the lens part;

detection means which detects a change amount of a rotation of the ring member for driving the lens part;

camera control means, provided in the [lens] camera part, [providing a plurality of characteristics each settable by a user] for selecting and determining a response characteristic between an output of said detection means and a motion of the magnification lens, and for [controlling motion/stop of at least the magnification lens along an optical axis in accordance with an output of said detection means] transmitting the selected response characteristic to the lens part through said communication means so as to set the selected response characteristic to control means which controls the motion of the magnification lens in response to the operation of the ring member; and

[transmitting means for performing communication between the camera part and the lens part; and]

storing means, provided in said camera part, for storing information of the response characteristic [transmitted from the lens part by said transmitting means] so that the selected response characteristic is not volatile even in the case of attaching/removing of the lens part.

18. (Twice Amended) An image pickup apparatus according to claim 17, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to be constant and a second characteristic for controlling a motion speed of the magnification lens to be variable in accordance with a rotation speed of the ring member.

19. (Amended) An image pickup apparatus according to claim 18, wherein the characteristic of said camera control means is changed in accordance with the state of an operation switch capable of being operated upon by a user.

20. (Amended) An image pickup apparatus according to claim 18, wherein the characteristic of said camera control means is changed in accordance with information of the characteristic of said camera control means set by a user.

21. (Amended) An image pickup apparatus according to claim 18, wherein the characteristic of said camera control means is changed in accordance with a photographing state.

22. (Twice Amended) An image pickup apparatus according to claim 17, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to become a first predetermined amount and a second characteristic for controlling a motion amount of the magnification lens per unit rotation of the ring member to become a second predetermined amount different from the first predetermined amount.

23. (Amended) An image pickup apparatus according to claim 22, wherein the characteristic of said camera control means is changed in accordance with the state of an operation switch capable of being operated upon by a user.

24. (Amended) An image pickup apparatus according to claim 22, wherein the characteristic of said camera control means is changed in accordance with information of the characteristic of said camera control means set by a user.

25. (Amended) An image pickup apparatus according to claim 22, wherein the characteristic of said camera control means is changed in accordance with a photographing state.

26. (Four Times Amended) An image pickup apparatus having [(i)] an image pickup apparatus main body and [(ii)] a lens part [unit], detachably mounted on said main body, which has a magnification lens and a ring member disposed concentrically about a lens optical axis, comprising:

communication means for performing communication between said main body and said lens part;

detection means for detecting a change amount of a rotation of the ring member [disposed concentrically about the lens optical axis] for driving said lens part;

camera control means, provided in the [lens unit] main body, for selecting and determining a response characteristic between an output of said detection means and a motion of the magnification lens, [said control means] and for [controlling motion/stop of at least the magnification lens along the optical axis in accordance with an output of said detection means] transmitting the selected response characteristic to said lens part;

lens control means, provided in said lens part, for receiving information concerning the selected response characteristic transmitted from said camera control means through said communication means, and for controlling the motion of said magnification lens in response to the operation of said ring member in accordance with the selected response characteristic; and

storing means, provided in said main body, for storing information of the response characteristic transmitted from said lens control means by said communication means so that the selected response characteristic is not volatile even in the case of attaching/removing of said lens part

[transmitting means for performing communication between the main body and the lens unit; and

outputting means for outputting information of the response characteristic from said lens unit to storing means in said main body by said transmitting means].

27. (Twice Amended) An image pickup apparatus according to claim 26, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to be constant and a second characteristic for controlling a motion speed of the magnification lens to be variable in accordance with a rotation speed of the ring member.

28. (Twice Amended) An image pickup apparatus according to claim 26, wherein the plurality of characteristics of said camera control means includes a first characteristic for controlling a motion amount of the magnification lens per unit rotation of at least the ring member to become a first predetermined amount and a second characteristic for controlling a motion amount of the magnification lens per unit rotation of the ring member to become a second predetermined amount different from the first predetermined amount.

29. (Cancelled)

30. (Cancelled)

31. (Amended) An image pickup apparatus according to claim [30] 27,
further comprising:

an operation switch capable of being operated upon by a user; and
change means for changing the characteristic of said camera control means
in accordance with a state of said operation switch.

32. (Amended) An image pickup apparatus according to claim 31,
wherein said change means changes the characteristic of said camera control means in
accordance with information of the characteristic of said camera control means set by a
user.

33. (Amended) An image pickup apparatus according to claim 32,
wherein said change means changes the characteristic of said camera control means in
accordance with a photographing state.

34. (Cancelled)

35. (Amended) An image pickup apparatus according to claim [34] 28,
further comprising:

an operation switch capable of being operated upon by a user; and
change means for changing the characteristic of said camera control means
in accordance with a state of said operation switch.

36. (Amended) An image pickup apparatus according to claim 35,
wherein said change means changes the characteristic of said camera control means in
accordance with information of the characteristic of said control means set by a user.

37. (Amended) An image pickup apparatus according to claim 36,
wherein said change means changes the characteristic of said camera control means in
accordance with a photographing state.

42. (Three Times Amended) An image pickup apparatus comprising:
a ring member disposed concentrically about a lens optical axis of a lens
unit;

detection means for detecting a change amount of rotation of said ring
member;

control means for performing motion/stop control of at least a magnification
lens group along the optical axis in accordance with a detection result by said detection
means; and

inhibition means for inhibiting [the magnification lens to stop] said control means from performing the stop control during a predetermined period when said detection means detects a stop of rotation of the ring member.

44. (Three Times Amended) An image pickup apparatus comprising:
a ring member disposed concentrically about a lens optical axis of a lens unit;

detection means for detecting a change amount of rotation of said ring member;

control means for determining motion direction and speed of a magnification lens group in accordance with an output of said detection means and performing motion/stop control of the magnification lens group along the optical axis; and

change means for changing a sensitivity of [the motion of the magnification lens group] motion/stop control of said control means relative to a detection result of said detection means so as to [change a detection amount of said ring member to be used for motion/stop control of the magnification lens group performed by said control means] start the motion of the magnification lens in accordance with a different detection result of said detection means.

48. (Four Times Amended) An image pickup apparatus having a magnification lens group, comprising:

a ring member disposed concentrically about a lens optical axis;

detection means for detecting a change amount of a rotation of said ring member;

lens control means for determining motion direction and a speed of the magnification lens group in accordance with an output from said detection means, and for performing motion/stop control of the magnification lens group along the optical axis; and

[change] control means for [changing] controlling said lens control means so as to change a sensitivity of the motion of the magnification lens group relative to a detection result of said detection means in accordance with a [state of a recording operation] photographing state.

50. (Twice Amended) An image pickup apparatus according to claim 48, wherein said [change] control means changes the motion speed of the magnification lens group relative to an output of said detection means.